

REMARKS

Applicant cancels claims 5, 6 and 9 and adds claims 11-16. Accordingly claims 1-4, 7-8, 10-16 are all the claims pending in the application.

Formal Matters

Applicant thanks the Examiner for the interview conducted on September 12, 2007.

Claim rejections

Claims 1-4, 7, 8 and 10 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Li, (US Patent No. 6,587,147) in view of Takada et al. (US Patent No. 6,661,458, herein after “Takada”) and Tokumitsu et al. (US patent 6,008,511, hereinafter “Tokumitsu”). Applicant traverses the rejections at least for the following reasons.

Claim 1

Claim 1, *inter alia*, recites a transmittance distribution means for realizing a spatial distribution of a ratio of a transmittance of said first component received by ones of said plurality of photoelectric conversion elements arranged in each portion of said light-reception area to a transmittance of each of the second and third components received by ones of the plurality of photoelectric conversion elements arranged in each said portion of the light-reception area, so that the ratio increases with a distance from a center of said light-reception area to each said portion of the light-reception area.

In the rejection of claim 1, the Examiner asserts that Li teaches the above noted unique feature of claim 1 in column 3, lines 14-17 (page 3, last paragraph of the Office Action). In particular, the Examiner asserts that element 130 of FIG. 1 corresponds to the transmittance distribution means. Applicant disagrees with the Examiner at least for the following reasons.

Li discloses an imaging system that includes an optical system 130 that channels light to create optical image on image sensor unit 105 (column 3, lines 14-17). Li illustrates (FIG. 2) and discloses that the image sensor unit 105 includes an image sensor 175 in package 172 and a transparent cover substrate (glass or plastic) 171 that overlies the image sensor 175 (column 3, lines 46-54). In addition, Li discloses that the optical system 130 includes a lens assembly 173 and an infrared blocking filter 174 that inhibits the infrared light from striking the image sensor unit 105 overlaying the lens assembly 173 (column 3, lines 55-59).

However, Li does not disclose a transmittance distribution means for realizing a spatial distribution of a ratio of a transmittance of said first component received by ones of said plurality of photoelectric conversion elements arranged in each portion of said light-reception area to a transmittance of each of the second and third components received by ones of the plurality of photoelectric conversion elements arranged in each said portion of the light-reception area, so that the ratio increases with a distance from a center of said light-reception area to each said portion of the light-reception area.

In particular, in the portion cited by the Examiner, Li merely discloses that the optical system 130 channels the incident energy to create an optical image (column 3, lines 14-17) and does not disclose realizing a spatial distribution of ratio of a transmittance of a first component received to a transmittance of each of second and third components received.

In addition the Examiner asserts that Tokumitsu discloses a solid-state image sensor with microlenses that are disposed to shifting their centers from aperture centers of the pixels by first shift amounts in a direction toward the chip center or chip peripheries, to minimize the shading in the peripheries for each color output individually (abstract and column 2, lines 20-33).

Furthermore, the Examiner contends that it would have been obvious to one of ordinary skill in the art at the time of the invention to have been motivated to modify Li in view of Takada and Tokumitsu, to have microlenses that are disposed to shift their centers from aperture centers of the pixels by first shift amounts so that the ratio increases with a distance from a center of said light-reception area to each said portion of the light-reception are, in order to minimize shading. Applicant respectfully disagrees.

Tokumitsu is directed to a solid-state image sensor, in which pitches or shift amounts of the microlenses on respective color pixels are determined independently for each kind of color pixels (column 2, lines 26-33). Tokumitsu illustrates (FIG. 3) and discloses, for a first color, microlens 1a-0 positioned in alignment with the aperture center and microlenses 1a-1 through 1a-3 are offset by shift amounts da1 through da3 from aperture centers. The shift amounts da1 through da3 are determined by a predetermined rate depending on the wavelength of the first color (column 4, lines 1-13).

Similarly, for a second color, Tokumitsu discloses microlens 1b-0 positioned in alignment with the aperture center and microlenses 1b-1 through 1b-3 are offset by shift amounts db1 through db3 from aperture centers. The shift amounts db1 through db3 are determined by a predetermined rate different from the rate of the first shift amount da1 through da3 (column 4, lines 14-30).

However, Tokumitsu does not disclose that the ratio, which is the ratio of a transmittance of a first component received to a transmittance of each of second and third components received, increases with a distance from a center of said light-reception area to each said portion of the light-reception area. In particular, Tokumitsu discloses that pitch or the shift amount for

each pixel is determined **independently** for each kind color pixels (column 2, lines 26-33) and that the increasing rate of shift amount for each kind of color pixels is determined depending on wavelengths and other factors of the particular kind of color pixel and has no relationship to the other color pixel (columns 4, lines 32-43).

Therefore, Tokumitsu does not disclose that the **ratio** as defined by claim 1 increases with a distance from a center of said light-reception area to each said portion of the light-reception area. In fact, the shift amount for each pixel being **determined independently** disclosed in Tokumitsu **teaches away** from **realizing a spatial distribution of a ratio of a transmittance of a first component** received to a **transmittance of each of second and third components** received and **the ratio increasing** with a distance from a center of the light-reception area to each portion of the light-reception area.

Furthermore, assuming *arguendo*, even if the microlenses of respective color pixels inherently disclose a ratio between the shift amounts of different colors, Tokumitsu still does not disclose the ratio between a first component and a second component increasing with a distance from a center of said light-reception area to each said portion of the light reception-area.

Applicant submits that Tokumitsu at best, is **ambiguous** in its teachings with regards to the ratio of the shift amounts of the different colors when moved away from the center of the light reception area. For instance, the ratio of the shift amounts between the different colors may increase; stay the same or even decrease when moved away from the center of the light-reception area. The Federal Circuit has ruled that when the cited art is ambiguous in its teachings, it is construed against the Examiner, In re Robertson, 49 USPQ2d 1949, 1951 (Fed. Cir. 1999). Since it is far from clear what the ratios of the shift amounts of different colors would be from a

distance away from the center of the light receiving area, let alone that it will result in the ratio of the transmittance increasing as recited in claim 1, Tokumitsu cannot disclose **the ratio of a transmittance of a first component to a second component increasing** with a distance from a center of the light-reception area to each portion of the light-reception area.

Applicant submits that because Tokumitsu and Takada do not cure the deficient teachings of Li with respect to the transmittance distribution means, and because Li and Takada do not cure the deficient teachings of Tokumitsu with respect to the ratio, claim 1 is allowable at least for the reasons given above.

Claims 2-4

Claims 2-4 depend from claim 1, and therefore they are allowable at least by virtue of their dependency.

Claim 8

Claim 8 recites subject matter analogous to claim 1, and therefore it should be allowable at least for similar reasons claim 1 is shown to be allowable.

Claims 7 and 10

Claims 7 and 10, *inter alia*, recites wherein relative positions between each said plurality of photoelectric conversion elements and one of said plurality of microlenses corresponding to the photoelectric conversion element are set in such a manner that **a ratio** of light-reception efficiency of the first component received by ones of said plurality of photoelectric conversion elements arranged in each portion of said light-reception area to light-reception efficiency of the second and third components received by ones of the plurality of photoelectric conversion elements arranged in each said portion of the light-reception area

increases with a distance from a center of the light-reception area to each said portion of the light-reception area.

Since claims 7 and 10 recite a ratio (as defined by claims 7 and 10) increases with a distance from a center of the light-reception area to each said portion of the light-reception area, they are allowable at least for the analogous reasons claim 1 is shown to be allowable.

New claims

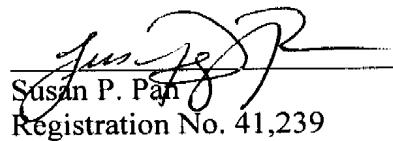
Applicant submits that claims 11-16 depend from one of the independent claims that have been shown to be allowable, and therefore they are also allowably by virtue of their dependency.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

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